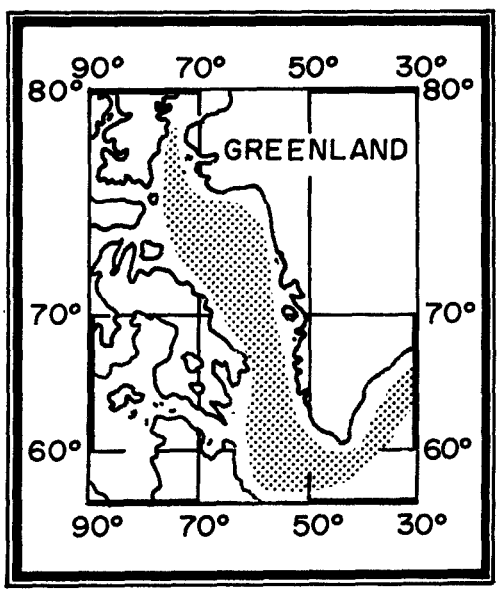
IR NO. 69-37

INFORMAL REPORT

# OCEANOGRAPHIC CRUISE SUMMARY BAFFIN BAY-DAVIS STRAIT-LABRADOR SEA, SUMMER 1968






MAY 1969





NAVAL OCEANOGRAPHIC OFFICE
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# INFORMAL REPORT

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ABSTRACT

The USCGC EASTWIND made an oceanographic survey of the Baffin Bay area during the summer of 1968. Ice potential stations were occupied in support of NAVOCEANO's East Arctic Ice Forecasting Program. Additional Nansen cast stations were taken to assist the U.S. Coast Guard in their continual monitoring of the Labrador Current.

A comparison of the temperature and salinity data obtained on the EASTWIND survey with data obtained on a similar cruise by USCGC EDISTO in 1967 seems to indicate that during both years the cooling season had begun prior to the survey.

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This report has been reviewed and is approved for release as an UNCLASSIFIED Informal Report.

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Director, Nearshore Surveys Division

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## I. PREVIOUS KNOWLEDGE OF THE REGION

The Labrador Sea, Baffin Bay, and Davis Strait areas are characterized by relatively warm, north setting surface currents in their eastern reaches and cold, south setting currents near their western shores. Towards the center of these areas, surface currents tend to be zonal and not as well developed as those found in the eastern and western boundaries. Waters originating in the Arctic Basin flow into the Labrador Sea-Baffin Bay area through Hudson Strait, Lancaster Sound, Jones Sound, and Smith Sound. Strong currents are sometimes encountered in the vicinity of Lancaster Sound and Hudson Strait.

Surface temperatures and salinities generally are low throughout most of the region. Maximum temperatures and salinities are associated with waters from the Atlantic Ocean. However, temperatures higher than 6°C are not common, and north of Davis Strait salinities rarely exceed 35 ‰.

## II. OBJECTIVES OF THE SURVEY

Established ice potential stations in the Labrador Sea, Baffin Bay, and Davis Strait areas were to be occupied in support of NAVOCEANO's continuing East Arctic Ice Forecasting Program and additional Nansen cast stations were to be taken to assist the U.S. Coast Guard in their continual monitoring of the Labrador Current.

## III. NARRATIVE OF THE SURVEY

The NAVOCEANO survey team boarded USCGC EASTWIND (WAGB 279) at Thule, Greenland, on 27 September 1968. A total of 59 oceanographic stations (Fig. 1) was occupied between 29 September and 28 October (operation number 929015). During this time, a 10-day delay occurred when EASTWIND assisted in a submarine cable repair. Data collected at each station are shown in Table I.

## IV. METHODS OF COLLECTION AND ANALYSIS

1. Temperature. Protected deep sea reversing thermometers, with a range of -2° to 10°C, were used to obtain in situ water temperatures. Agreement between temperature readings of the paired thermometers was normally 0.06°C or better.

2. Sample Depth. Thermometric depths were determined by the L-Z method described in N.O.O. Pub. 607 using meter wheel readings, wire angles, and unprotected thermometers with a range of -2° to 30°C.

3. Bathythermographs. A deep range (900 ft) mechanical BT was used to obtain temperature versus depth profiles before each ice forecast station.

4. Salinity. Salinities were determined with a Bisset-Berman (Model 6220) inductive salinometer. Duplicate determinations were run on each sample, and if the difference between determinations was greater than 0.004 ‰ additional runs were made. The salinometer was standardized with standard sea water before and after each series of determinations. The salinity analyses are estimated to have an accuracy of ±0.01 ‰ in most instances.

## V. DISPOSITION OF DATA

All data have been filed at the National Oceanographic Data Center, under cruise reference number 311353.

## VI. PRELIMINARY ANALYSES

Salinity and temperature versus depth diagrams (Figs. 2 through 5) were drawn for selected stations to compare the hydrographic conditions encountered by EASTWIND with those of the 1967 ice forcasting survey done by USCGC EDISTO (WAGB 284). Each of the comparative figures show lower surface temperatures on the station occupied at the later date. At stations 28 and 39, lower temperatures existed throughout the water column (Figs. 3 and 5).

Overall, variations in the data appear to be the result of local conditions, and no annual variations can be readily deduced. The data seem to indicate that during both years the cooling season had begun prior to the survey period.

## VII. RECOMMENDATIONS FOR ADDITIONAL WORK

The NAVOCEANO ice forecasters have recommended that additional studies be made of the currents and water masses entering the Baffin Bay area to assist them in the prognostication of ice conditions for their annual ice outlook. Davis Strait was surveyed in July and August 1968 (IR-68-117), but yet to be investigated are Hudson Strait, Lancaster Sound, Jones Sound, and Smith Sound. Seasonal data on both the currents and water structure also would be helpful.

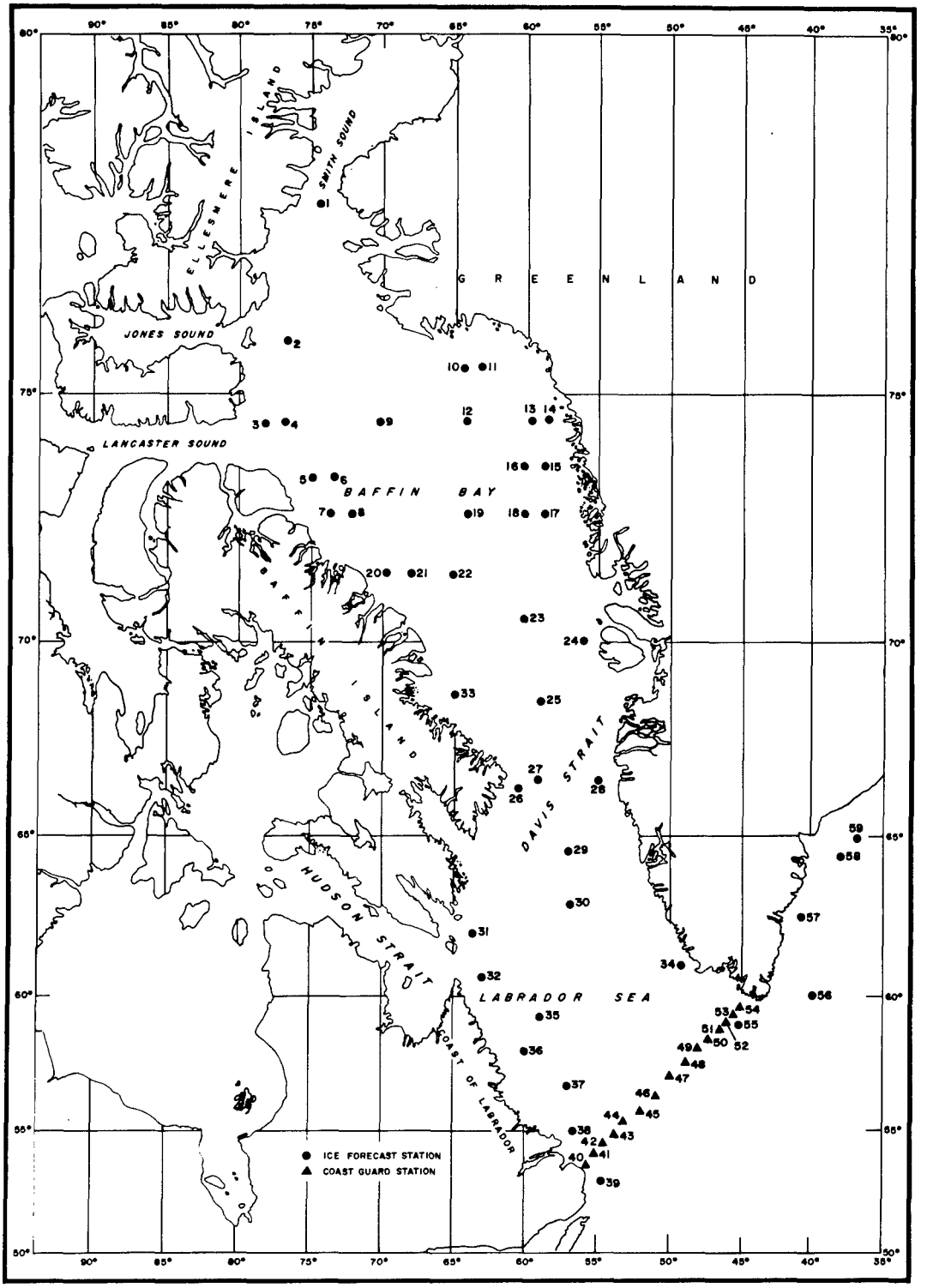



FIGURE 1. OCEANOGRAPHIC STATION LOCATIONS OCCUPIED BY EASTWIND

TABLE 1. EASTWIND DATA COLLECTION SUMMARY

| Stat. No. | Sonic Depth (Meters) | Sample Depth (Meters) | Temp. Sal. | BT |
|---|---|---|---|---|
| 1 | 683 | 468 | ✓ | |
| 2 | 279 | 270 | ✓ | ✓ |
| 3 | 649 | 350 | ✓ | ✓ |
| 4 | 603 | 300 | ✓ | ✓ |
| 5 | 950 | 262 | ✓ | ✓ |
| 6 | 900 | 300 | ✓ | ✓ |
| 7 | 815 | 300 | ✓ | ✓ |
| 8 | 1,060 | 300 | ✓ | ✓ |
| 9 | 1,646 | 300 | ✓ | ✓ |
| 10 | 155 | 140 | ✓ | ✓ |
| 11 | 205 | 183 | ✓ | ✓ |
| 12 | 759 | 292 | ✓ | ✓ |
| 13 | 744 | 289 | ✓ | ✓ |
| 14 | 292 | 211 | ✓ | ✓ |
| 15 | 300 | 200 | ✓ | ✓ |
| 16 | 190 | 150 | ✓ | ✓ |
| 17 | 190 | 150 | ✓ | ✓ |
| 18 | 660 | 317 | ✓ | ✓ |
| 19 | 2,200 | 216 | ✓ | ✓ |
| 20 | 795 | 317 | ✓ | ✓ |
| 21 | 2,000 | 287 | ✓ | ✓ |
| 22 | 2,330 | 308 | ✓ | ✓ |
| 23 | 677 | 290 | ✓ | ✓ |
| 24 | 137 | 104 | ✓ | ✓ |
| 25 | 330 | 264 | ✓ | ✓ |
| 26 | 420 | 300 | ✓ | ✓ |
| 27 | 731 | 275 | ✓ | ✓ |
| 28 | 90 | 75 | ✓ | ✓ |
| 29 | 442 | 265 | ✓ | ✓ |
| 30 | 2,222 | 325 | ✓ | ✓ |
| 31 | 538 | 300 | ✓ | ✓ |
| 32 | 365 | 271 | ✓ | ✓ |
| 33 | 137 | 100 | ✓ | ✓ |
| 34 | 118 | 110 | ✓ | ✓ |
| 35 | 3,000 | 280 | ✓ | ✓ |
| 36 | 242 | 223 | ✓ | ✓ |
| 37 | 2,470 | 310 | ✓ | ✓ |
| 38 | 201 | 181 | ✓ | ✓ |
| 39 | 219 | 197 | ✓ | ✓ |
| 40* | 164 | 143 | ✓ | |
| 41* | 164 | 145 | ✓ | |
| 42* | 201 | 185 | ✓ | |
| 43* | 385 | 400 | ✓ | |
| 44* | 3,063 | 2,569 | ✓ | |
| 45* | 3,475 | 3,254 | ✓ | |
| 46* | 3,658 | 3,629 | ✓ | |
| 47* | 3,658 | 3,497 | ✓ | |
| 48* | 3,475 | 3,405 | ✓ | |
| 49* | 3,383 | 3,350 | ✓ | |
| 50* | 2,853 | 2,758 | ✓ | |
| 51* | 2,560 | 2,540 | ✓ | |
| 52* | 2,434 | 2,382 | ✓ | |
| 53* | 1,829 | 1,399 | ✓ | |
| 54* | 128 | 102 | ✓ | |
| 55 | 2,195 | 323 | ✓ | ✓ |
| 56 | 1,350 | 325 | ✓ | ✓ |
| 57 | 475 | 306 | ✓ | ✓ |
| 58 | 823 | 312 | ✓ | ✓ |
| 59 | 421 | 274 | ✓ | ✓ |

* Coast Guard Station

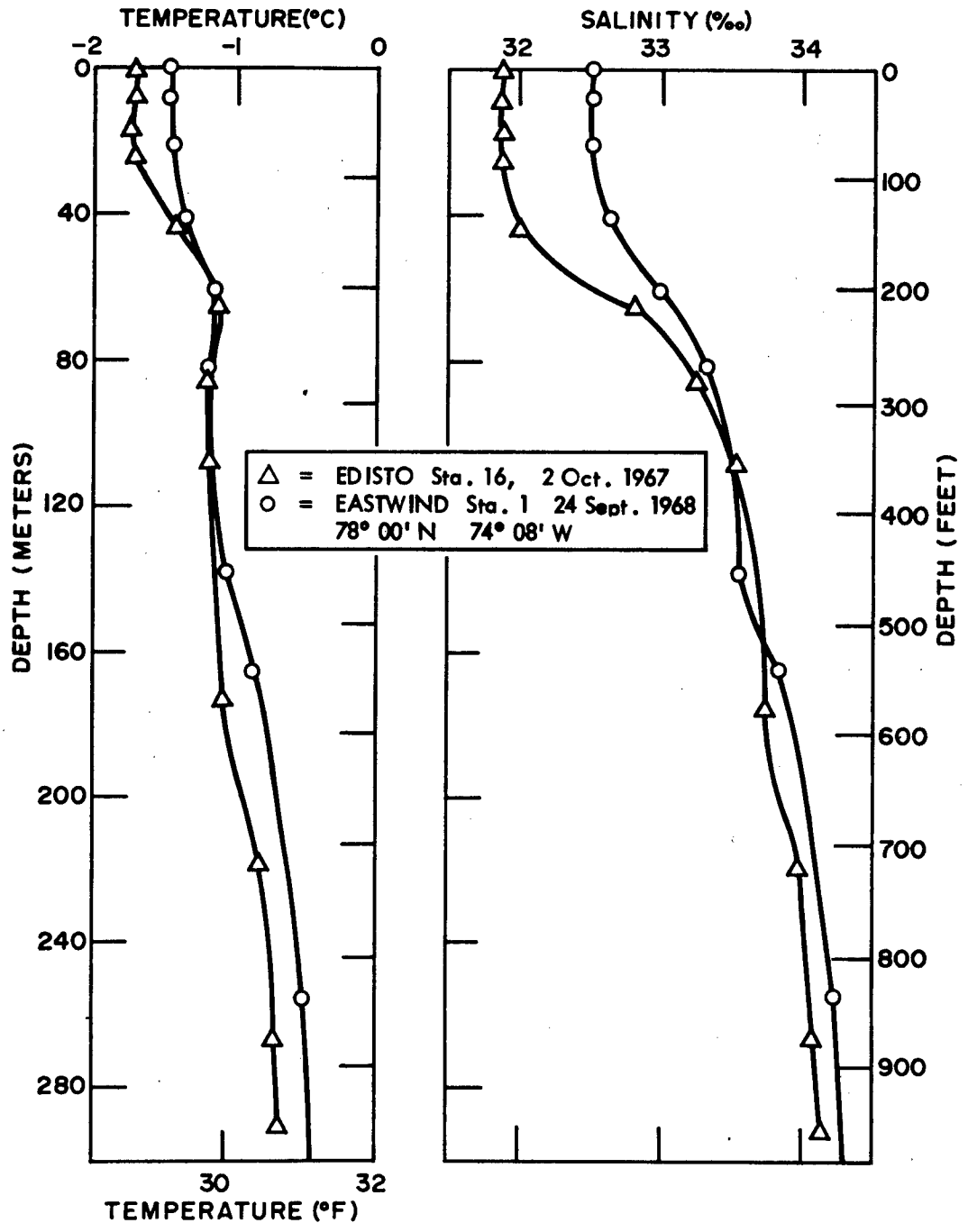
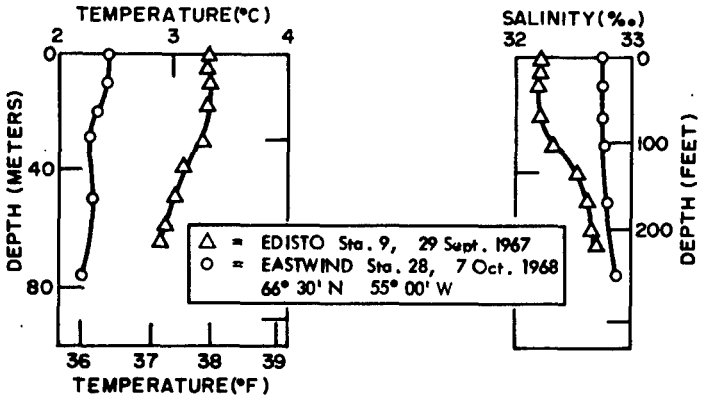



FIGURE 2. COMPARISON OF TEMPERATURE AND SALINITY DATA OBTAINED BY EASTWIND AND EDISTO

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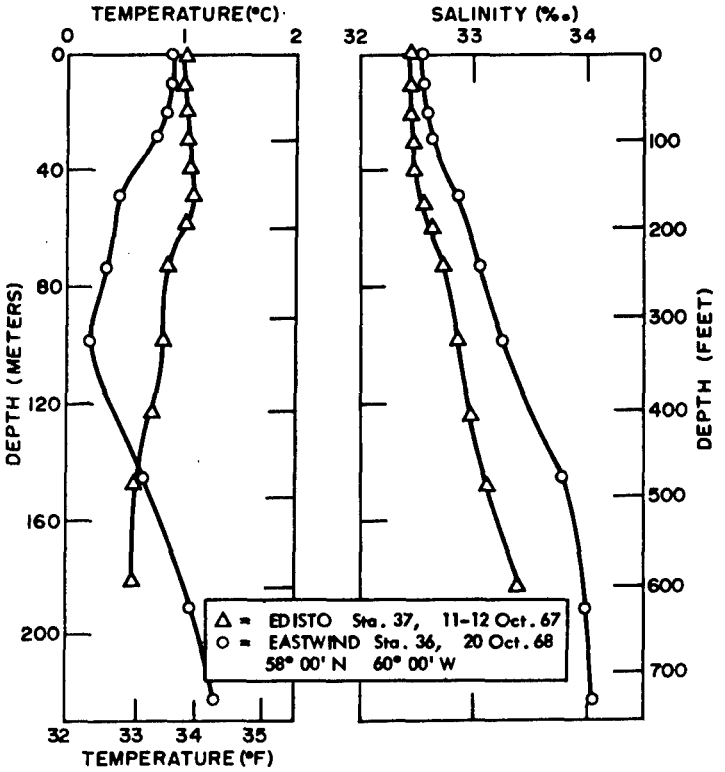


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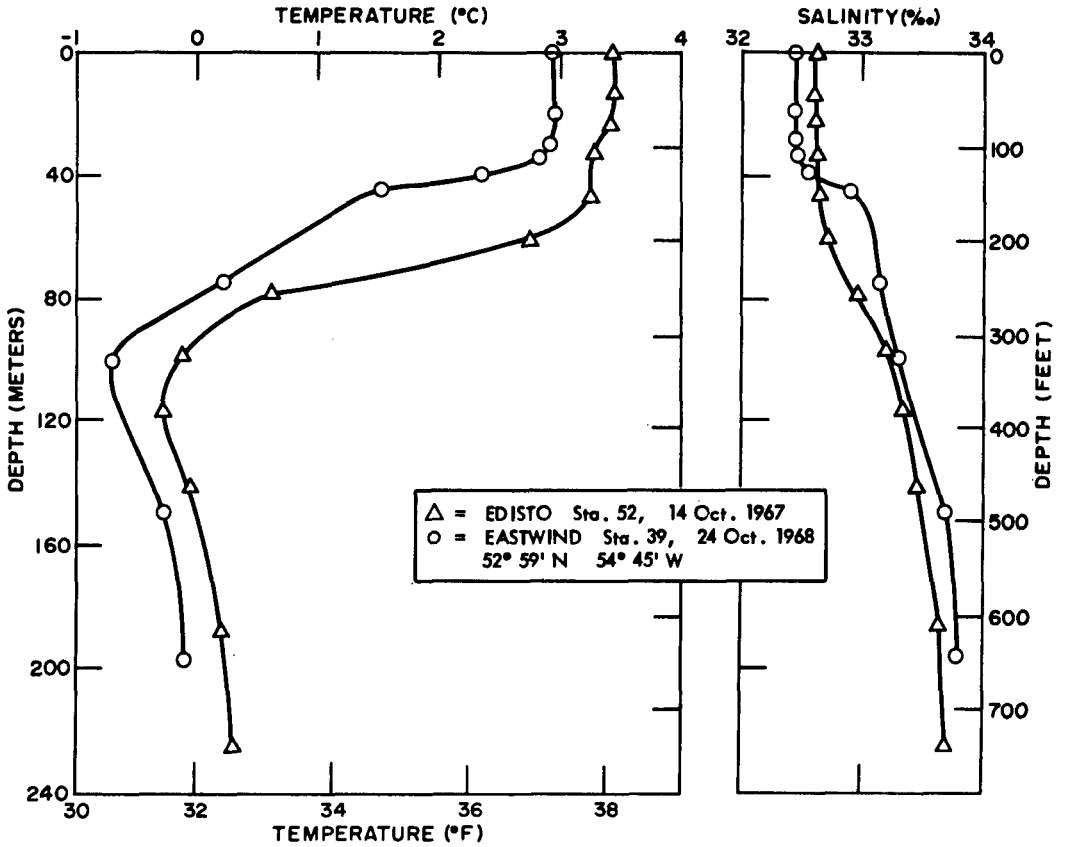


FIGURE 5. COMPARISON OF TEMPERATURE AND SALINITY DATA OBTAINED BY EASTWIND AND EDISTO

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| 14. KEY WORDS | LINK A | | LINK B | | LINK C | |
|---|---|---|---|---|---|---|
| | ROLE | WT | ROLE | WT | ROLE | WT |
| OCEANOGRAPHIC CRUISE SUMMARY<br>BAFFIN BAY - DAVIS STRAIT - LABRADOR SEA<br>USCGC EASTWIND (WAGB 279)<br>EAST ARCTIC ICE FORECASTING PROGRAM<br>LABRADOR CURRENT | | | | | | |